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Incidence of dental developmental anomalies in permanent dentition among Ardabil population, Iran, in 2015-2016

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Original Article

Abstract

BACKGROUND AND AIM: Dental anomalies are typically detected in radiographic screening. The present study was conducted with the aim of investigating the dental anomalies found in panoramic radiographs taken from the study population in Ardabil, Iran, in 2015-2016.

METHODS: The present study was conducted on 1800 panoramic radiographs obtained from 799 men and 1001 women in the Radiology Department, Dental Faculty of Ardabil University of Medical Sciences, Ardabil. The radiographs were precisely evaluated in terms of various dental anomalies, including root dilaceration, missing teeth, impaction, retained deciduous, supernumerary teeth, peg lateral teeth, talon cusp, taurodontism, and lingual pit. The data were analyzed using the chi-square and Fisher's exact tests.

RESULTS: The results of this study revealed that 331 patients had at least one dental anomaly. Dilaceration with 42.0% was the most common anomaly. The other anomalies detected in the radiographs included missing teeth, impaction, lingual pit, peg lateral teeth, retained deciduous teeth, supernumerary teeth, talon cusp, and taurodontism with a rate of 20.2%, 18.4%, 10.8%, 10.2%, 7.8%, 6.6%, 1.5%, and 0.3%, respectively. No cases of microdontia, macrodontia, germination, and fusion were observed. Dental anomalies were more incident among women than men (P = 0.010). Furthermore, the detected anomalies had a higher rate in maxilla compared to mandible (P = 0.010).

CONCLUSION: As the findings of this study indicated, dilaceration was the most common dental anomaly, followed by missing teeth and impaction, respectively.

KEYWORDS: Incidence; Dentition; Anomalies; Panoramic; Radiography

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Developmental dental anomalies are a series of structural changes in human dentition that are diagnosed with alterations in size, shape, position, and number of the teeth.[1] Disturbances in tooth formation may occur in different stages of tooth development and can be congenital or developmental.[2-4] In this regard, genetic factors, like mutation of certain genes, and environmental factors can cause these conditions.[5,6]

Dental anomalies are less common in comparison to dental caries and periodontal diseases, however, they greatly interfere in the dental treatment planning.[7,8] Dental anomalies create problems in the function, occlusion, and esthetics of the patients; therefore, the early diagnosis of these deviations are of paramount importance.[9-11] Since most of these disorders are asymptomatic, the early detection of these anomalies requires the use of panoramic radiographs during the clinical dental examination.[12] The incidence of dental

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anomalies yields significant data for phylogenic and genetic investigations. Moreover, these anomalies considerably affect the orthodontic, endodontic, and prosthodontic treatment planning.

The incidence of dental anomalies has been investigated among different populations. Nonetheless, different results have been reported regarding the incidence and distribution by gender, age, and site of the occurrence. With this background in mind, the present study was conducted to determine the incidence of dental anomalies and the most involved teeth through the examination of patients' panoramic radiographs.

Methods

This study was based on the evaluation of the panoramic radiographs of 1800 patients (including 799 men and 1001 women) referring to the Oral Radiology Department, Dental Faculty of University of Medical Sciences, Ardabil, Iran during 2015-2016. The inclusion criteria included age of > 12 years, sufficient enamel formation, and no history of permanent tooth extraction, except for the third molar.

In addition, the exclusion criteria included history of systemic diseases or syndromes (e.g., Down's syndrome, cleidocranial dysostosis (CCD), and ectodermal dysplasia), cleft lip and cleft palate, trauma or fracture of jaws, orthodontic treatment, and low-quality radiographs.

The teeth were considered impacted when their eruption interfered with other teeth, bone, or soft tissues. Taurodontism was defined as an apical displacement of the pulp chamber, elongation of the tooth trunk, and shortened roots. Dilaceration was defined as the abrupt deviation of the long axis of the crown or root portion of the tooth. In this study, roots with 20 degrees or more deviation from the normal axis of the tooth were considered to be dilacerations. Furthermore, the missing teeth were referred to congenital absence of teeth. Tooth supernumerary was defined by an increase in the number of teeth.

The radiographs were studied by two expert dentists based on direct observational method using a view box. In order to reduce the radiographic misinterpretation, two oral radiologists carefully studied the findings and verified them. The patients' panoramic radiographs showed at least one dental anomaly. For all of the patients, the radiographs were ordered by other dentists for routine dental treatments during 2015-2016.

The radiographs were evaluated to recognize dental anomalies, including dilacerations, impacted teeth, supernumerary teeth, missing teeth, taurodontism, microdontia, macrodontia, gemination, fusion, dens in dent, talon cusp, and peg lateral. The collected data were analyzed using descriptive and inferential statistics including chi-square and Fisher's exact tests in SPSS (version 16, SPSS Inc., Chicago, IL, USA).

Results

This study comprised of 799 men and 1001 women including 44.4% and 55.6% of the subjects, respectively with the age range of 12-60 years. Out of the 1800 selected records, 331 (18.4%) cases had at least one dental anomaly. The incidence rates of anomalies were 11.4% and 7.0% among the women and men, respectively. The comparison of men and women in terms of the incidence of dental anomalies revealed a significant difference between them in this regard (P = 0.001). Maxilla was found to be more involved than mandible (P = 0.001). The distribution and incidence of developmental dental anomalies are presented in tables 1 and 2.

Dilaceration was found to be the most incident dental anomaly with 42.0% (Figure 1), followed by missing teeth and impaction with rates of 20.2% and 18.4% shown in figures 2 and 3, respectively. Additionally, taurodontism and dens invaginatus were observed in one and two patients, respectively. However, no case of macrodontia, germination, or fusion was detected.

Table 1. Incidence of anomalies among the population under study based on gender

Type of anomaly	Man	Woman	Total rate [n (%)]	P
Dilaceration	47	92	139 (42.0)	< 0.001
Missing teeth	37	30	67 (20.2)	0.392
Impacted teeth	19	42	61 (18.4)	0.009
Lingual pit	13	23	36 (10.8)	0.090
Peg lateral	13	21	34 (10.2)	0.170
Retained deciduous teeth	7	19	26 (7.8)	0.190
Supernumerary teeth	12	10	22 (6.6)	0.670
Talon cusp	3	2	5 (1.5)	0.650
Taurodontism	1	-	1 (0.3)	-
Total numbers of anomalies	152	248	400 (100)	-

Figure 1. Dilaceration of left maxillary and mandibular premolars

The most common involved teeth in dilaceration were mandibular first premolars, followed by mandibular second premolars.

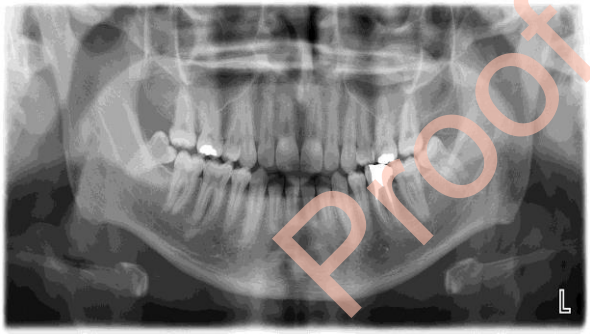

Figure 2. Missing of right and left maxillary and mandibular second premolars

Furthermore, mandibular second premolar was the most frequent missing teeth, followed by maxillary permanent lateral incisor. Maxillary canines and mandibular second premolars were the most incident impacted teeth. Supernumerary tooth was the next common anomaly with the incidence rate of 6.6%. Out of the 22 supernumerary teeth, mesiodens was the most common supernumerary tooth detected among 8 men and 3 women with the ratio of 2:1.

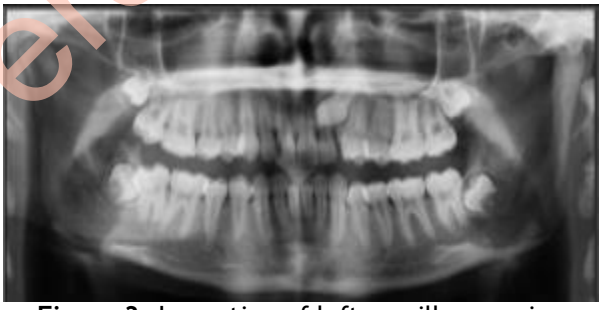

Figure 3. Impaction of left maxillary canine

The results of this study revealed a significant difference between maxilla and mandible with regard to impaction, missing, and retained dental anomalies (P = 0.001, P = 0.038, and P = 0.050, respectively). However, no such difference was observed in terms of other anomalies.

Table 2. Incidence of anomalies among population under study based on the site

Type of anomaly	Maxilla	Mandible	Total number [n (%)]	P
Dilaceration	59	80	139 (42.0)	0.075
Missing teeth	42	25	67 (20.2)	0.038
Impacted teeth	44	17	61 (18.4)	0.001
Lingual pit	34	2	36 (10.8)	< 0.001
Peg lateral	34	0	34 (10.2)	< 0.001
Retained deciduous teeth	18	8	26 (7.8)	0.050
Supernumerary teeth	14	8	22 (6.6)	0.200
Talon cusp	4	1	5 (1.5)	0.180
Taurodontism	1	-	1 (0.3)	-

Discussion

Developmental dental anomalies include changes in the number, morphology, size, and eruption of the teeth. Systemic or local factors may account for these anomalies.[13] The incidence and degree of these anomalies are inconsistent for different population groups. The anomalies of the teeth are usually identified in routine clinical and radiographic examinations.

In the present study, the incidence of dental anomalies diagnosed by panoramic radiographs was approximately 18.4%, however, some other studies have reported different rates. In this regard, Kathariya et al. reported the incidence rate of 39.2% for dental anomalies among the school-age children in India in 2012.[8]

Furthermore, in the studies carried out by Ezoddini et al. in Yazd, Iran,[14] Shokri et al. in Hamadan, Iran,[15] and Yassin in Saudi Arabia,[16] the incidence rates of dental anomalies were reported as 40.80%, 27.00%, and 25.39%, respectively. This discrepancy in the reports may be due to differences in evaluation criteria and also genetic and regional factors among the studies. In line with the other studies, in the current study, the women had a higher incidence rate of dental anomalies.[2,7,10,17]

Dilaceration was the most common recorded anomaly in the present study as 42%. The most incident teeth with dilacerations were the mandibular first premolars, followed by mandibular second premolars. However, Ezoddini et al reported an incidence rate of 15% dilacerations in Yazd.[14] This difference between the results of the present study and those of the aforementioned study may be due to the use of periapical radiographs instead of panoramic radiographs for the detection of the developmental disturbances in Yazd. Consistent with the present study, Saberi and Ebrahimipour reported that dilacerated teeth were the most common anomaly in Zahedan, Iran.[2]

According to the results of the present study, the incidence of missing teeth was 20.2%, which was generally higher than those obtained in other populations.[7,14,17] The absence of teeth was bilateral in 52.2% of the cases. In the current study, men and women were comparable in terms of the incidence of missing teeth, which is in congruence with the findings of other studies. There are some differences in the literature concerning the description of the most frequently missing tooth, excluding third molars.

In this study, the most common congenital missing teeth were the mandibular second premolars and maxillary lateral incisors, respectively; this finding is consistent with the results obtained by Kim.[18] In the studies performed by Gomes et al.[19] and Gupta et al.,[1] the incidence of missing maxillary lateral incisors was higher than that of the mandibular second premolars.

The impaction of maxillary permanent canines is a dental anomaly often encountered in orthodontic practice. Tooth impaction accounted for 18.4% incidence in the present study, and the maxillary canine was the most impacted tooth. Kathariya et al. showed that impactions as 39.2% were the most incident anomaly among the Indian population, and most of the impacted teeth were related to maxilla.[8] The Incidence rates of 44.76%, 8.30%, and 2.95% for impaction have been reported by Shokri et al.,[15] Ezoddini et al.,[14] and Ghabanchi et al.,[7] respectively, in different regions of Iran. This inconsistency between the results might be ascribed to the consideration of third molars.

In the present study, the incidence rates of the supernumerary teeth and taurodontism were 6.6% and 0.3%, respectively. In a study conducted by Ezoddini et al., taurodontism with a rate of 7.5%, was reported to be more incident in Yazd compared to the present study.[14] In addition, Eshgi reported an incidence rate of 5.38% for taurodontism in Zahedan.[2]

Conclusion

As the findings of the present study indicated, the rate and types of dental

anomalies vary among different populations. According to the results, dilaceration was the most common dental anomaly, followed by missing and impaction, respectively. Various dental anomalies with different frequencies occur in many countries, and even within the same country among different ethnic or regional groups. The early recognition and careful management of dental anomalies can prevent prosthodontic or orthodontic treatment complications.

Conflict of Interests

Authors have no conflict of interest.

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References

1. Gupta SK, Saxena P, Jain S, Jain D. Prevalence and distribution of selected developmental dental anomalies in an Indian population. J Oral Sci 2011; 53(2): 231-8.
2. Saberi EA, Ebrahimipour S. Evaluation of developmental dental anomalies in digital panoramic radiographs in Southeast Iranian Population. J Int Soc Prev Community Dent 2016; 6(4): 291-5.
3. Hall C, Hallett K, Manton D. The association between Cri du chat syndrome and dental anomalies. J Dent Child (Chic) 2014; 81(3): 171-7.
4. Marques LS, Alcantara CE, Pereira LJ, Ramos-Jorge ML. Down syndrome: A risk factor for malocclusion severity? Braz Oral Res 2015; 29: 44.
5. Thesleff I. Genetic basis of tooth development and dental defects. Acta Odontol Scand 2000; 58(5): 191-4.
6. White SC, Pharoah MJ. Oral radiology: Principles and interpretation. Philadelphia, PA: Mosby p. 330-65; 2004.
7. Ghabanchi J, Haghnegahdar AA, Khodadazadeh S, Haghnegahdar S. A radiographic and clinical survey of dental anomalies in patients referring to Shiraz dental school. Shiraz Univ Dent J 2010; Vol 10, ement 2010; 10(Suppl): 26-31.
8. Kathariya MD, Nikam AP, Chopra K, Patil NN, Raheja H, Kathariya R. Prevalence of dental anomalies among school going children in India. J Int Oral Health 2013; 5(5): 10-4.
9. Bailit HL. Dental variation among populations. An anthropologic view. Dent Clin North Am 1975; 19(1): 125-39.
10. Afify AR, Zawawi KH. The prevalence of dental anomalies in the Western region of Saudi Arabia. ISRN Dent 2012; 2012: 837270.
11. Asaumi JI, Hisatomi M, Yanagi Y, Unetsubo T, Maki Y, Matsuzaki H, et al. Evaluation of panoramic radiographs taken at the initial visit at a department of paediatric dentistry. Dentomaxillofac Radiol 2008; 37(6): 340-3.
12. Bedoya MM, Park JH. A review of the diagnosis and management of impacted maxillary canines. J Am Dent Assoc 2009; 140(12): 1485-93.
13. Guttal KS, Naikmasur VG, Bhargava P, Bathi RJ. Frequency of developmental dental anomalies in the Indian population. Eur J Dent 2010; 4(3): 263-9.
14. Ezoddini AF, Sheikhha MH, Ahmadi H. Prevalence of dental developmental anomalies: A radiographic study. Community Dent Health 2007; 24(3): 140-4.
15. Shokri A, Poorolajal J, Khajeh S, Faramarzi F, Kahnamoui HM. Prevalence of dental anomalies among 7- to 35-year-old people in Hamadan, Iran in 2012-2013 as observed using panoramic radiographs. Imaging Sci Dent 2014; 44(1): 7-13.
16. Yassin SM. Prevalence and distribution of selected dental anomalies among Saudi children in Abha, Saudi Arabia. J Clin Exp Dent 2016; 8(5): e485-e490.
17. Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. Am J Orthod Dentofacial Orthop 2009; 135(3): 328-35.
18. Kim YH. Investigation of hypodontia as clinically related dental anomaly: Prevalence and characteristics. ISRN Dent 2011; 2011: 246135.
19. Gomes RR, da Fonseca JA, Paula LM, Faber J, Acevedo AC. Prevalence of hypodontia in orthodontic patients in Brasilia, Brazil. Eur J Orthod 2010; 32(3): 302-6.